# Potato Leafhopper Variety Selection Trials

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**Introduction**

During the summer of 2002, leafhopper populations arrived early and caused considerable damage to potato crops throughout New York. Organic growers were especially hard-hit as there are no effective organic controls against leafhopper. As a result, variety trials on two organic farms were carried out in 2003 and continued in 2004. The goal was to evaluate and find varieties that were resistant to leafhopper damage and produced acceptable yields without spraying to control the leafhoppers.

**2003 Results**

The trials were held at two locations, Sisters Hill Farm in Dutchess County and Pleasant View Farm in Washington County. Thanks to David Hambleton of Sisters Hill Farm and Sandy and Paul Arnold of Pleasant Hill Farm for all the work they did in conducting the trials. At each farm, the varieties were replicated twice, two 15 foot plots for each variety. The varieties were evaluated in mid August for leafhopper burn. Yield results were only obtained from Washington County.

**Location 1 - Sisters Hill farm, Dutchess County, Dave Hambleton**
**Location 2 - Pleasant View Farm, Washington County, Sandy and Paul Arnold**

*** Hopper burn Rating 1-5 (1 - No visible damage ; 5 - dead vines)**

| Variety | Location | Sampled 8/18/03 LH Rating | Lbs. Yield/ 15" Row |
|---|---|---|---|
| **Reba** | 1 | 5 | |
| | 2 | 4 | 15 |
| **Rosa** | 1 | 4.5 | |
| | 2 | 4 | 26 |
| **Salem** | 1 | 4.5 | |
| | 2 | 2.5 | 16 |
| **Keuka Gold** | 1 | 1.5 | |
| | 2 | 3 | 26 |
| **Red La Soda** | 1 | 4 | |
| | 2 | 3.5 | 19 |

| | | | |
|---|---|---|---|
| **Adirondack Blue** | 1 | 5 | |
| | 2 | 4 | 33 |
| **Allegany** | 1 | 5 | |
| | 2 | 4 | 11 |
| **Elba** | 1 | 2 | |
| | 2 | 1.5 | 32 |
| **Eva** | 1 | 3 | |
| | 2 | 3 | 15 |
| **Genessee** | 1 | 2.5 | |
| | 2 | 2 | 18 |
| **Katahdin** | 1 | 3.5 | |
| | 2 | 3 | 26 |
| **L235-4** | 1 | 1 | |
| | 2 | 2 | 19 |
| **Marcy** | 1 | 3 | |
| | 2 | 1 | 42 |
| **NY 121** | 1 | 5 | |
| | 2 | 5 | 17 |
| **NY 126** | 1 | 2 | |
| | 2 | 2.5 | 13 |
| **Red Norland** | 1 | 4 | |

The leafhopper population in 2003 was not nearly as heavy as the previous year, but still some varieties had completely dead vines by mid August. Marcy had the best yield and significant resistance to leafhopper damage. Adirondack Blue and Elba had reasonably good yield despite a high degree of leafhopper damage. The top six yielding varieties were Marcy, Elba, Adirondack Blue, Katahdin, Keuka Gold and Rosa. On a small scale, an evaluation organic growers use for potato production is 1.5 pounds of potatoes per row foot. Production at or above 2 pounds per row foot is considered very good.

Looking at the data, any variety with a 3 or less on the leafhopper rating (LH Rating) had significant green tissue at the time of the rating. Leaf hoppers showed less of a preference for these varieties.

In a taste test at a twilight meeting to discuss the trial, several people liked individual varieties like Rosa because of the way it looked or tasted, but the choices of the top 5 were surprisingly consistent. The top five varieties chosen by the meeting attendees according to appearence, marketable yield and taste were Elba, Eva, NY 126, Adirondack Blue and Katahdin. Adirondack Blue seemed to hold its blue color when cooked in a

microwave – this is an important characteristic since many blue potatoes appear gray when cooked.

**2004 Results**

The 2004 trials were held at Sisters Hill Farm in Dutchess County (again) and at Roxbury Farm in Columbia County. Thanks go out to David Hambleton of Sisters Hill farm and John Paul Courtens of Roxbury Farm. The Columbia trial was planted on May 11 and 12. The Dutchess tr1al was planted the week of May 17. Both trials consisted of two replications of 15 foot plots of each variety.

Leafhopper levels were very different at the two locations. Dutchess County had lower populations and therefore plants stayed green longer. The potato field was virgin ground, never having been planted to vegetables and this could help explain the low level of leafhoppers. The vines at the Dutchess County location were still growing in early September. At the Columbia County location, most vines were down by the end of July and almost completely dead by the middle of August. This is probably closer to normal for potato production on organic farms. Varieties were evaluated for leafhopper damage three times in Dutchess and four times in Columbia County.

A reason why it is nice to have trials at different locations is sometimes there are problems. At the Dutchess County location, the labels identifying the different varieties faded by sunlight. This made it very difficult to differentiate the varieties in the rows. As a result, of the 19 varieties planted, data was collected on only 11 of the varieties. At the Columbia location, part of the field was low and collected water during part of the season. While quality did not seem to be affected, variety replications in the lower section of the field had lower yields.

Data showing the results are in two tables at the end of the narrative

Results were quite similar to 2003. Marcy was the highest producer, same as the previous year. Katahdin also looked good in both leafhopper resistance and yield. This is an old variety and these results show why it has longevity. Keuka Gold in one plot produced the highest individual yield for 15 feet. (The Columbia Co. grower particularly liked this variety). Again, on a small scale, an evaluation organic growers use for potato production is 1.5 pounds of potatoes per row foot. Production at or above 2 pounds per row foot is considered very good. Adirondack Blue also produced high yields and was as leafhopper burn resistant as just about any other variety. Adirondack blue was the favored variety of the Dutchess County grower. Both growers asked where seed for these varieties could be found. They said they would definitely grow some of the trial varieties if only seed was more widely available.

Table 1 shows yield and comments during grading.

Table 2 shows the leafhopper ratings over the summer. The LH Score is the average leafhopper rating and a number lower than 3 is considered good.

As a result of these trials, organic growers were able to evaluate different potato varieties under field conditions. Organic growers are primarily looking for good tasting varieties that produce well. On years where leafhopper populations are heavy, yields can be drastically reduced. By trialing varieties over a number of years, organic growers can see which varieties do well without spraying for leafhopper. By doing the trials themselves they can also evaluate for taste.

Next year, we would like to add a taste trial component to the variety trial. The two participating growers run CSA (community supported agriculture) elements to their operations. Consumers purchase shares of produce, which they then receive throughout the summer and into the fall. Utilizing the CSA members, it would be easy to evaluate after the season for taste of the different varieties. Using this consumer preference data, growers will then have another tool to use when marketing – taste. They would also have another way to evaluate which variety they decide to grow.

Table 1 **Harvest Evaluation - 2004 Potato Leaf Hopper Variety trial - Columbia County** **Yield Data**

| Variety | Rep # | # 2" | wt. 2" (lbs) | # 3" | wt. 3" | # Chef | wt. Chef | Total Weight | Comments |
|---|---|---|---|---|---|---|---|---|---|
| **NY126** | **1** | 43 | 5.75 | 85 | 22.25 | 1 | 0.75 | 28.75 | |
| | **2** | 39 | 5.75 | 61 | 16.5 | 0 | 0 | 22.25 | Some rot; uniform |
| **Reba** | **1** | 24 | 3 | 64 | 19 | 3 | 2 | 24 | |
| | **2** | 66 | 8.5 | 45 | 13 | 1 | 0.5 | 22 | |
| **Rosa** | **1** | 80 | 8.5 | 86 | 21.5 | 0 | 0 | 30 | uniform; nice |
| | **2** | 126 | 12.5 | 37 | 8 | 3 | 1.5 | 22 | small; lots! |
| **Salem** | **1** | 73 | 18.25 | 63 | 15.75 | 0 | 0 | 34 | goood set; uniform |
| | **2** | 131 | 14 | 23 | 5.5 | 0 | 0 | 19.5 | some rots |
| **Keuka Gold** | **1** | 51 | 6.5 | 97 | 29.5 | 3 | 2 | 38 | thin skin, uniform; nice |
| | **2** | 106 | 8.25 | 62 | 7.75 | 1 | 1.25 | 17.25 | round |
| **Red La Soda** | **1** | 12 | 1.5 | 23 | 7.25 | 3 | 2.5 | 11.25 | |
| | **2** | 56 | 7.75 | 57 | 16.5 | 12 | 6.75 | 31 | growth cracks |
| **All Blue** | **1** | 186 | 16 | 23 | 5 | 0 | 0 | 21 | small |
| | **2** | 157 | 16.5 | 6 | 1.5 | 0 | 0 | 18 | good set; very small |
| **Adirondack Blue** | **1** | 55 | 6.5 | 95 | 26.5 | 0 | 0 | 33 | nice |
| | **2** | 123 | 12 | 67 | 18 | 5 | 2 | 32 | |
| **Allegany** | **1** | 36 | 5 | 34 | 9 | 2 | 1.25 | 15.25 | clean |
| | **2** | 53 | 8 | 37 | 10.5 | 2 | 1.5 | 20 | round |
| **Binjte** | **1** | 160 | 14 | 104 | 20 | 0 | 0 | 34 | |
| | **2** | 147 | 13.5 | 82 | 15.5 | 3 | 1 | 30 | small; nice shape |
| **Elba** | **1** | 44 | 6 | 81 | 24 | 0 | 0 | 30 | |
| | **2** | 50 | 6.5 | 71 | 22 | 1 | 0.5 | 29 | uniform, round; some scab |
| **Eva** | **1** | 40 | 5.75 | 88 | 26.25 | 3 | 1.75 | 33.75 | uniform; nice |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **2** | 52 | 8 | 70 | 20 | 0 | 0 | 28 | scab |
| **Genessee** | **1** | 46 | 5.75 | 57 | 18 | 1 | 0.5 | 24.25 | clean |
| | **2** | 46 | 6 | 47 | 13.5 | 5 | 2.5 | 22 | round |
| **Gn. Mtn.** | **1** | 122 | 14 | 91 | 22.5 | 0 | 0 | 36.5 | scab |
| | **2** | 115 | 13.5 | 64 | 17.75 | 3 | 1.5 | 32.75 | thin skin; scab |
| **Katahdin** | **1** | 93 | 0 | 80 | 10 | 10 | 20 | 30 | thin skin; scab |
| | **2** | 99 | 12.5 | 43 | 13 | 1 | 0.75 | 26.25 | bad; lots of scab |
| **Yukon Gold** | **1** | 33 | 4 | 45 | 12 | 2 | 1 | 17 | some scab |
| | **2** | 65 | 8.25 | 27 | 7.75 | 2 | 1.25 | 17.25 | round |
| **L235-4** | **1** | 65 | 7 | 102 | 27 | 0 | 0 | 34 | growth cracks, lumpy, not pretty |
| | **2** | 76 | 10 | 81 | 25 | 6 | 4 | 39 | thin skin; scab |
| **Marcy** | **1** | 50 | 5.5 | 93 | 24.25 | 0 | 0 | 29.75 | |
| | **2** | 44 | 6 | 72 | 24 | 9 | 5.25 | 35.25 | good-sized |
| **NY 121** | **1** | 141 | 14 | 23 | 5 | 0 | 0 | 19 | small; lots! |
| | **2** | 166 | 18.5 | 28 | 13 | 0 | 0.5 | 32 | |
| **NY 125** | **1** | 115 | 13.25 | 72 | 16.5 | 1 | 0.5 | 30.25 | thin skin |
| | **2** | 113 | 15 | 9 | 18 | 0 | 0 | 33 | little scab |
| **Red Norland** | **1** | 70 | 7.25 | 62 | 17 | 0 | 0 | 24.25 | growth cracks |
| | **no rep 2** | | | | | | | 0 | |
| **TOTALS** | | 3409 | 384.25 | 2545 | 691.25 | 86 | 64.75 | | |

## 2004 Potato Leafhopper Variety Selection Trial

**Table 2** **Leafhopper Ratings**

Roxbury Farm, Columbia County, John-Paul Courtens
Sisters Hill Farm, Dutchess County, David Hambleton

* Columbia Location Data collection
Hopper burn Rating 1-5 (1 - No detectable damage; 5 - vines dead)

| Location | 6/21/04 | 7/16/2004* | 7/23/2004* | 7/27/04 | 7/30/2004* | 8/6/2004* | 8/25/04 | LH Score | Rep 1 Wt. | Rep 2 Wt. |
|---|---|---|---|---|---|---|---|---|---|---|
| Columbia | | 2 | 2 | | 3 | 4 | | 2.8 | 24 | 22 |
| Dutchess | | | | | | | | | | |
| Columbia | | 2 | 2.5 | | 3 | 3.5 | | 2.8 | 30 | 22 |
| Dutchess | 1.5 | | | 2.5 | | | 5 | 3.0 | 25 | 16 |
| Columbia | | 3 | 3.5 | | 4.5 | 5 | | 4.0 | 34 | 20 |
| Dutchess | | | | | | | | | | |
| Columbia | | 1 | 2.5 | | 3 | 4 | | 2.6 | 38 | 17 |
| Dutchess | | | | | | | | | 6 | |
| Columbia | | 2.5 | 2.5 | | 3 | 4 | | 3.0 | 11 | 31 |
| Dutchess | | | | | | | | | | |
| Columbia | | 1.5 | 2 | | 3 | 4 | | 2.6 | 21 | 18 |
| Dutchess | 1 | | | 1 | | | 5 | 2.3 | 18 | 16 |
| Columbia | | 1.5 | 1.5 | | 3 | 4.5 | | 2.6 | 33 | 32 |
| Dutchess | 1 | | | 1.5 | | | 5 | 2.5 | 27.5 | 15.5 |
| Columbia | | 2.5 | 3 | | 3 | 4 | | 3.1 | 15 | 20 |
| Dutchess | | | | | 3 | | | 3.0 | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Columbia | | 2 | 2.5 | | 3.5 | 4.5 | | 3.1 | 34 | 30 |
| Dutchess | 1.5 | | | 2 | | | 4 | 2.5 | 19 | 22 |
| Columbia | | 2 | 2 | | 3 | 4 | | 2.8 | 30 | 29 |
| Dutchess | | | | | | | | | | |
| Columbia | | 2 | 2 | | 3 | 3.5 | | 2.6 | 34 | 28 |
| Dutchess | 1 | | | 1.5 | | | 4 | 2.2 | 19 | 14 |
| Columbia | | 2 | 2.5 | | 3 | 3.5 | | 2.8 | 24 | 22 |
| Dutchess | | | | | | | | | | |
| Columbia | | 1.5 | 2 | | 2.5 | 4 | | 2.5 | 37 | 33 |
| Dutchess | 1 | | | 2 | | | 4 | 2.3 | 23 | 23 |
| Columbia | | 1.5 | 1.5 | | 2.5 | 3.5 | | 2.3 | 20 | 30 |
| Dutchess | 1.5 | | | 2 | | | 5 | 2.8 | 16 | 13 |
| Columbia | | 2 | 2 | | 3 | 3.5 | | 2.6 | 17 | 17 |
| Dutchess | 1 | | | 1 | | | 5 | 2.3 | 6 | 17 |
| Columbia | | 0,5 | 1 | | 2.5 | 3.5 | | 2.3 | 34 | 39 |
| Dutchess | | | | | | | | | | |
| Columbia | | 1.5 | 2 | | 3 | 4 | | 2.6 | 30 | 35 |
| Dutchess | | | | | | | | | | |
| Columbia | | 2 | 3 | | 3.5 | 4.5 | | 3.3 | 19 | 32 |
| Dutchess | | | | | | | | | | |
| Columbia | | 1.5 | 2.5 | | 3.5 | 4.5 | | 3.0 | 30 | 33 |
| Dutchess | 1.5 | | | 2.5 | | | 5 | 3.0 | 25 | 19 |
| Columbia | | 1 | 2 | | 2.5 | 4 | | 2.4 | 29 | 22 |
| Dutchess | 1.5 | | | 2 | | | 5 | 2.8 | 21 | 18 |
| Columbia | | 4 | 4 | | 5 | 5 | | 4.5 | | |